



ARPA-E MOVE Conference
San Pedro, Ca.
October 15 - 16, 2014



Bill Zobel
VP Trillium CNG

Trillium CNG - Customer-Focused CNG Solutions

TRILLIUM CNG AND THE INTEGRYS ENERGY GROUP

Integrys Energy Group (NYSE: TEG)



Regulated Electric &
Natural Gas Utilities

Electric Transmission

Non-regulated
Retail Services

Integrys
Transportation Fuels



Upper Peninsula Power Company



EVO Trillium
AMP Trillium

TRILLIUM CNG – A TURNKEY CNG PROVIDER

Comprehensive CNG Fueling Solutions

- Fast-Fill, Time Fill, Public, Private and Semi-Public Access
- Full suite of commodity instruments – fixed pricing, cost collars, forward hedge instruments, etc.

Compression Equipment

- High capacity refueling products, manufactured in the USA
- Temporary and Portable CNG stations

Compressed Gas Services

- CNG station design, construction, operations & maintenance
- Transaction management services
- NFPA and local Fire Code facility upgrades

Capital Financing, Equipment Leasing & Grant Services

- Financing – CNG Stations and Vehicle Conversions
- CNG Station Leasing
- Grant acquisitions for customers to offset truck and station costs



- Core Services
- Value Added Services

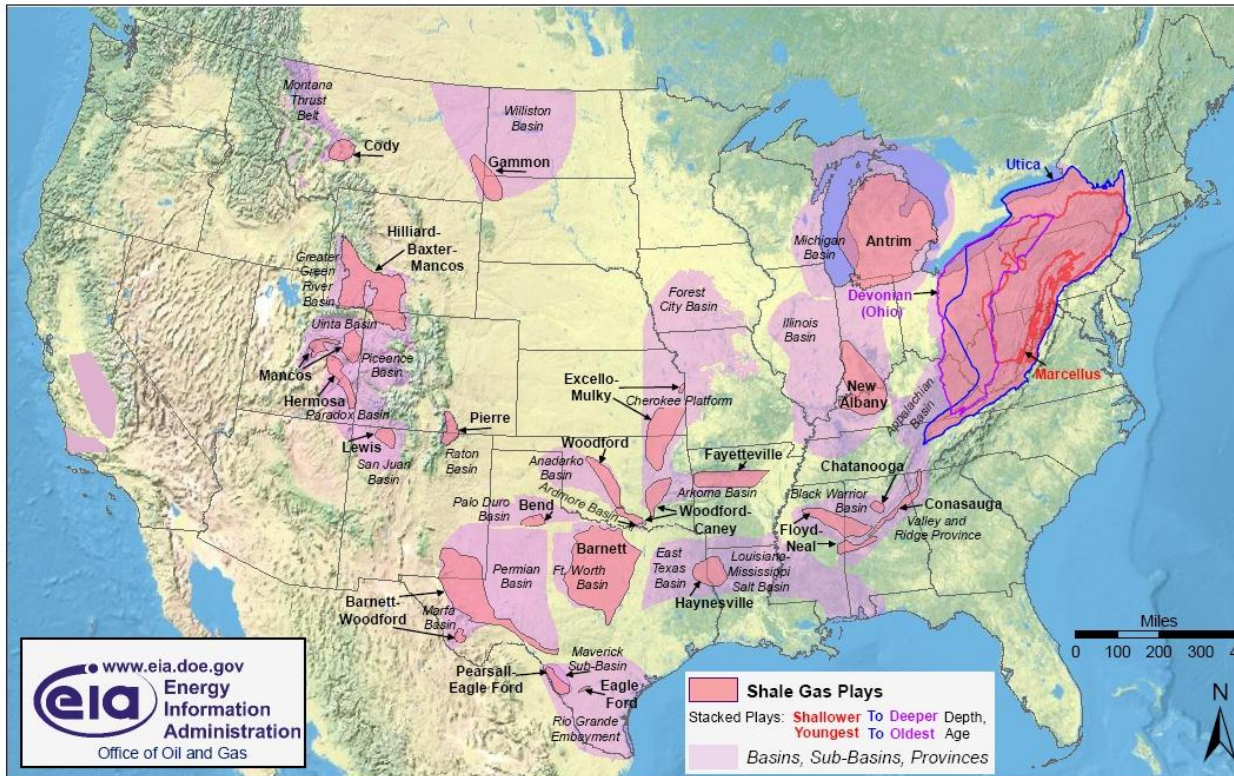
CNG MARKET — OVERVIEW AND FORECAST

- Market Fundamentals
- National Infrastructure Buildout
- HD Vehicle Forecast



THE US IS THE SAUDI ARABIA OF NATURAL GAS

Abundant domestic gas supply ensures low and stable natural gas pricing long term



The facts on US gas supply:

The Potential Gas Committee (PGC) report April 2013 :

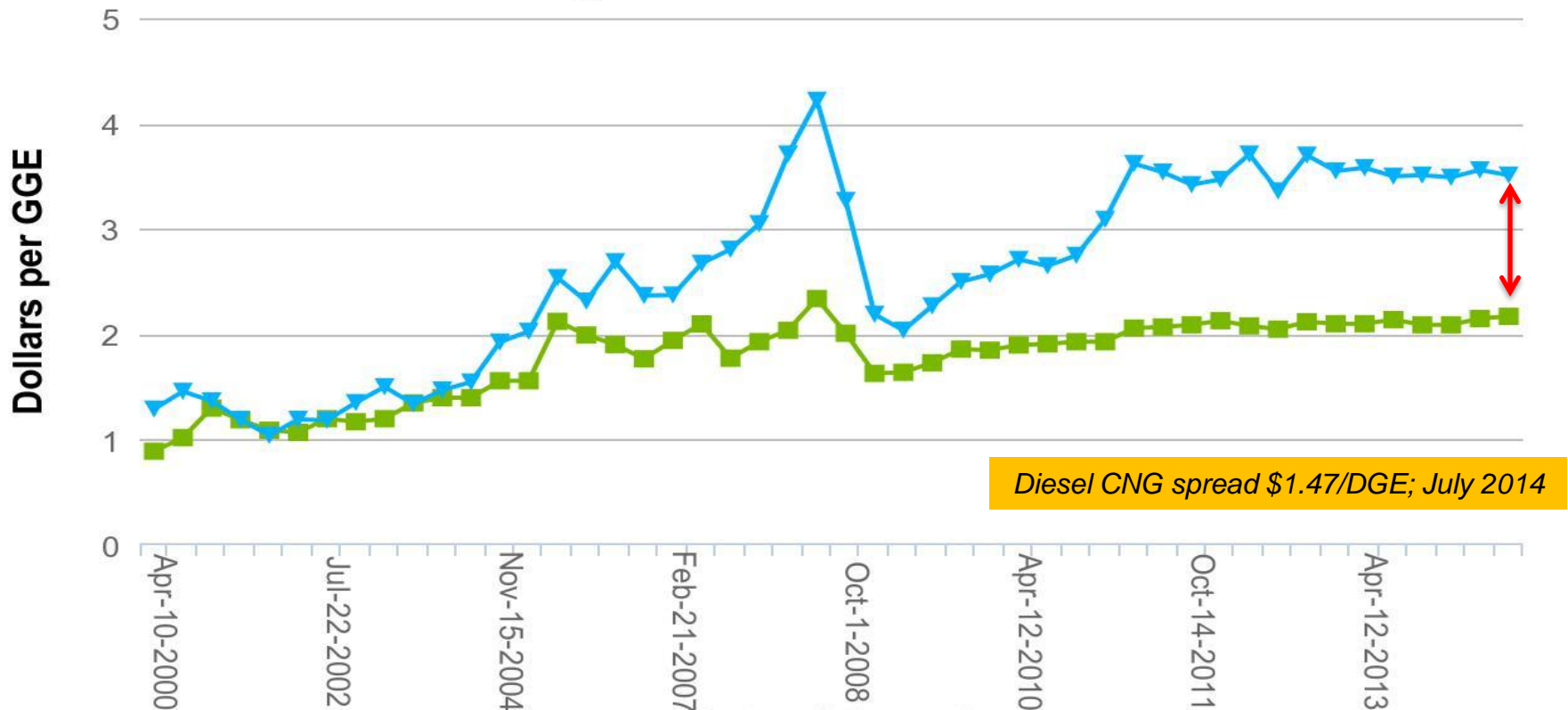
- 21% increase in natural gas reserves over the 2010 estimate
- Highest domestic gas reserve estimate in US history
- Over 100 years of supply

- Domestic natural gas is a game changer for the US economy
 - Exploration technology continues to open up new reserves
 - Increasing resource base will act as a buffer to price spikes

US AVERAGE RETAIL FUEL PRICES - DOE

CNG market is driven by strong market fundamentals

Average Retail Fuel Prices in the U.S.

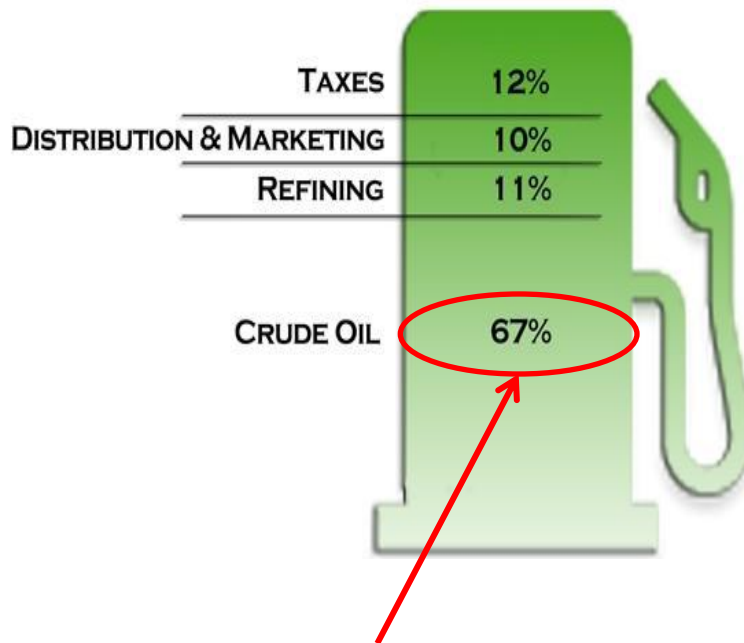


A fleet using 1,000,000 DGE/year can save ~\$1,470,000 on fuel costs

CNG PRICES ARE MORE PREDICTABLE & LESS VOLATILE

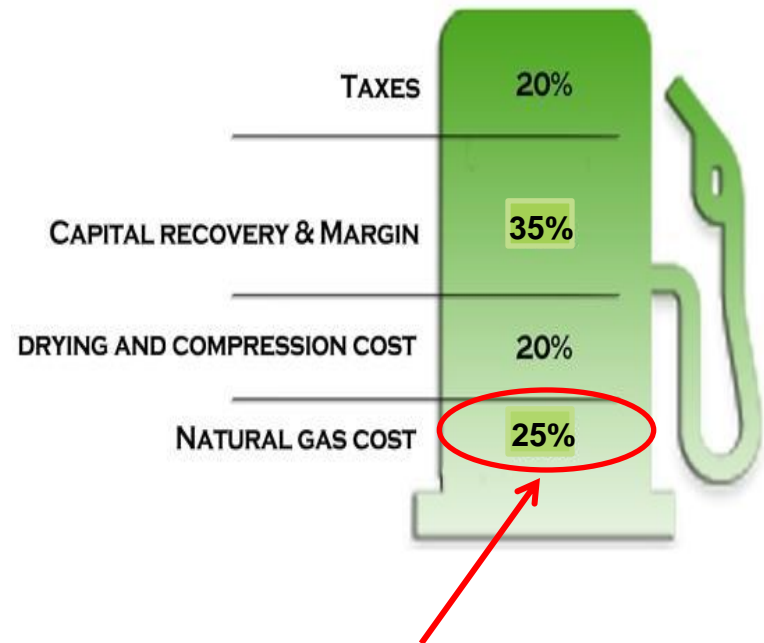
CNG has less fuel volatility than diesel and provides more predictable pricing

DOE National Average Diesel Price⁽¹⁾ \$3.82/gallon



Diesel Price Volatility more directly correlated to cost of Crude Oil...

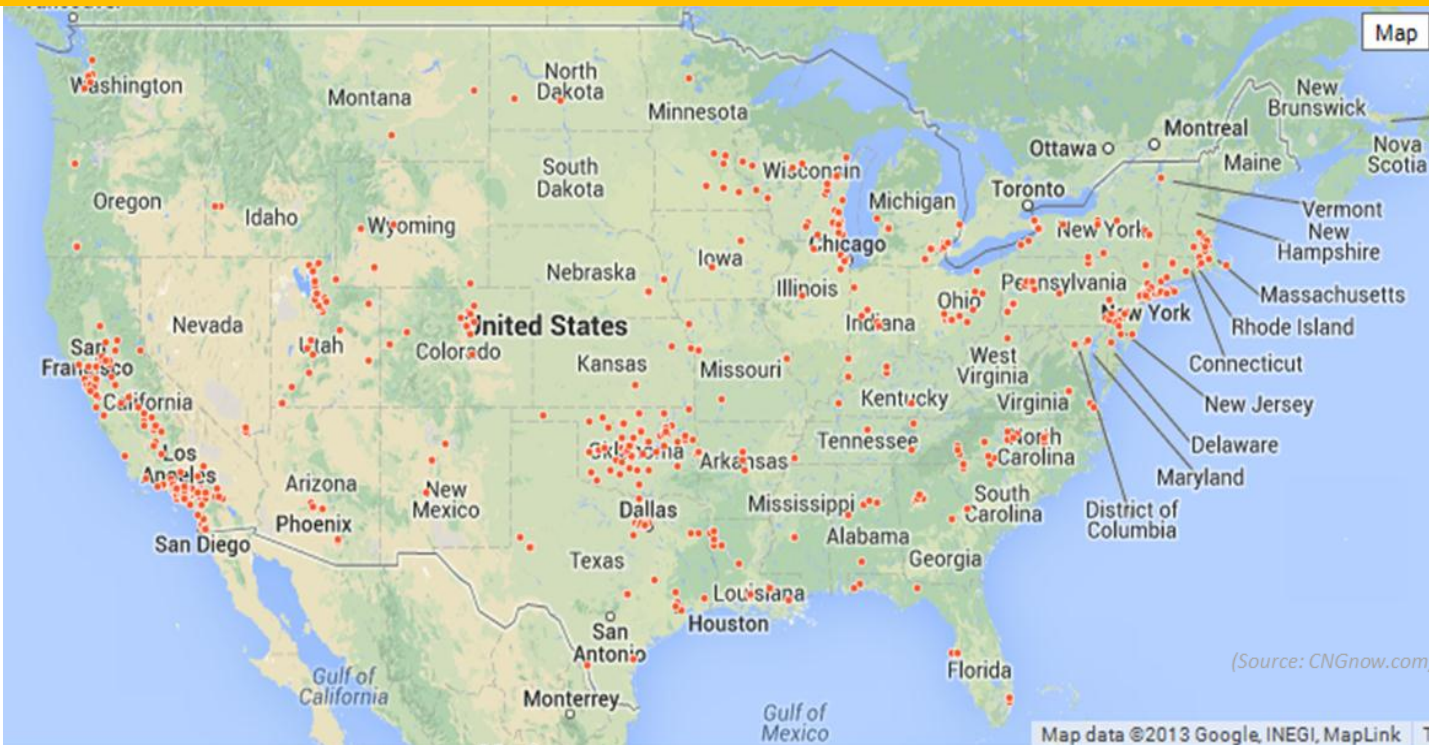
National Average Retail CNG Price⁽²⁾ \$2.39/DGE



CNG Price Volatility not as directly affected by market cost of Natural Gas...

US PUBLIC CNG REFUELING STATIONS

CNG Stations growing nationally at a rapid pace

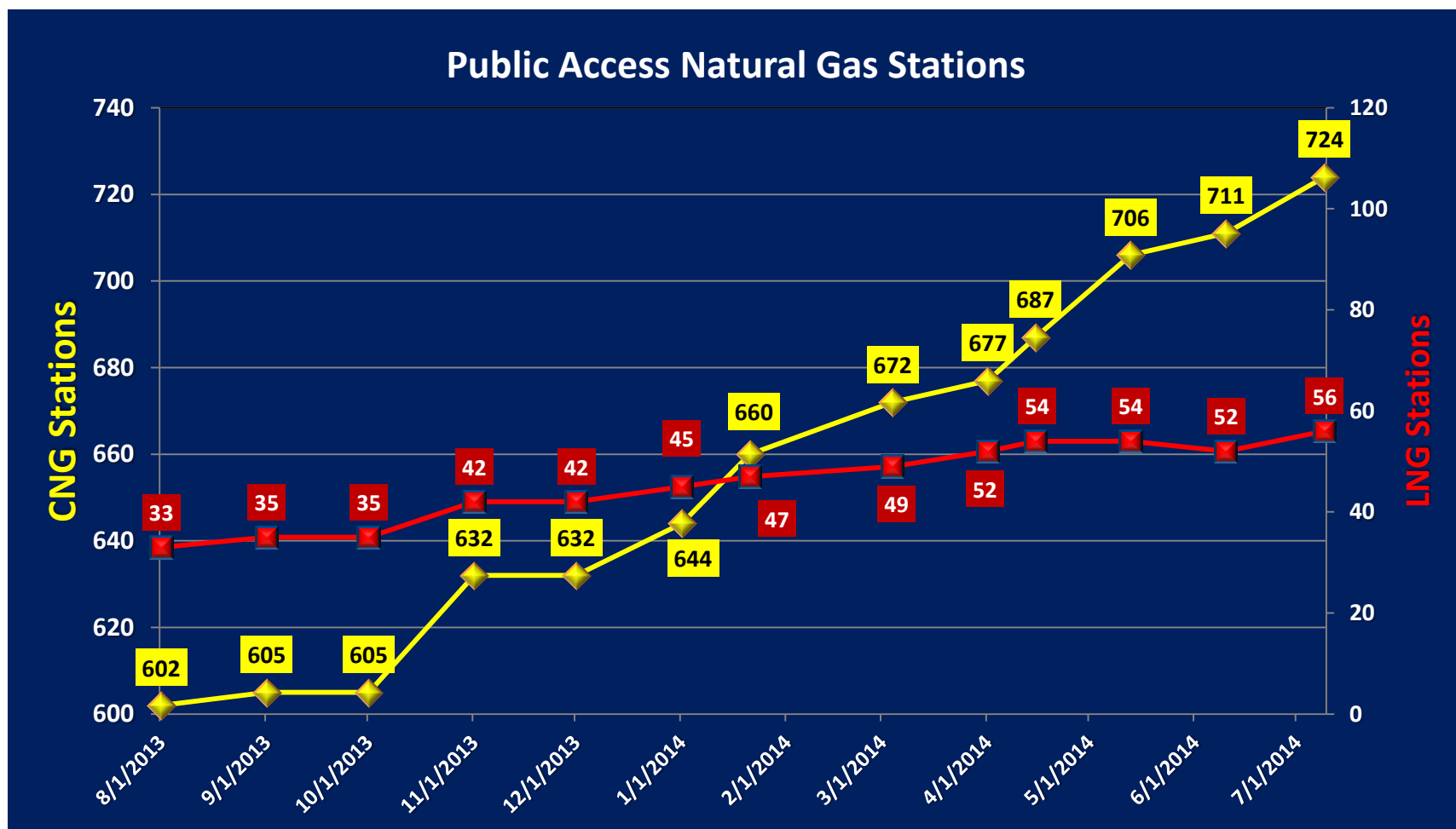


CNG refueling infrastructure in the US

- ~1,370 CNG refueling stations in the US (Aug 2014)
- 672 Public and ~700 Private
- Market expected to add between 200 and 400 stations per year through 2020

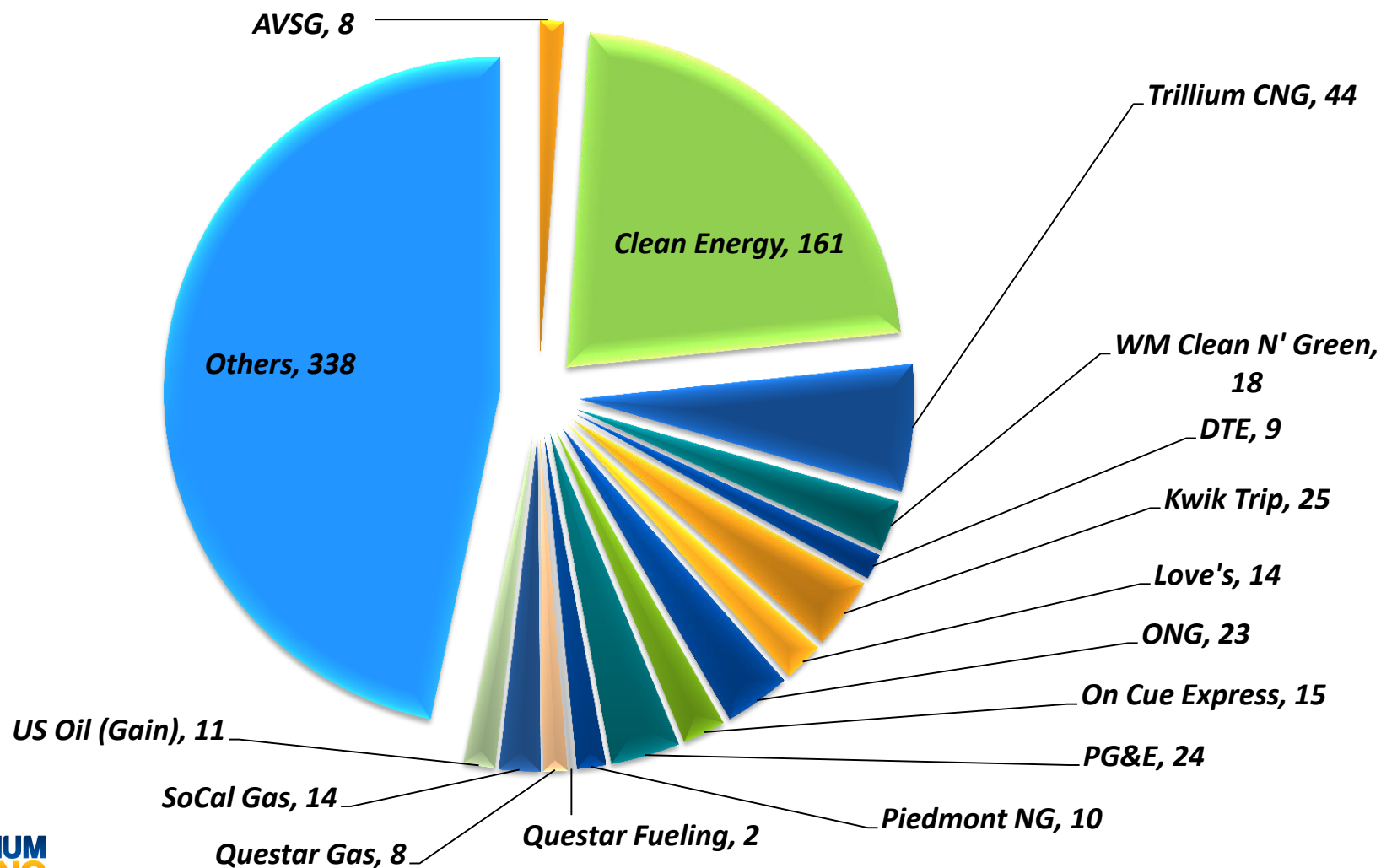
CNG STATIONS GROWING RAPIDLY TO SUPPORT VEHICLE SALES

CNG station developers added over ~120 new CNG sites in the last 12 months



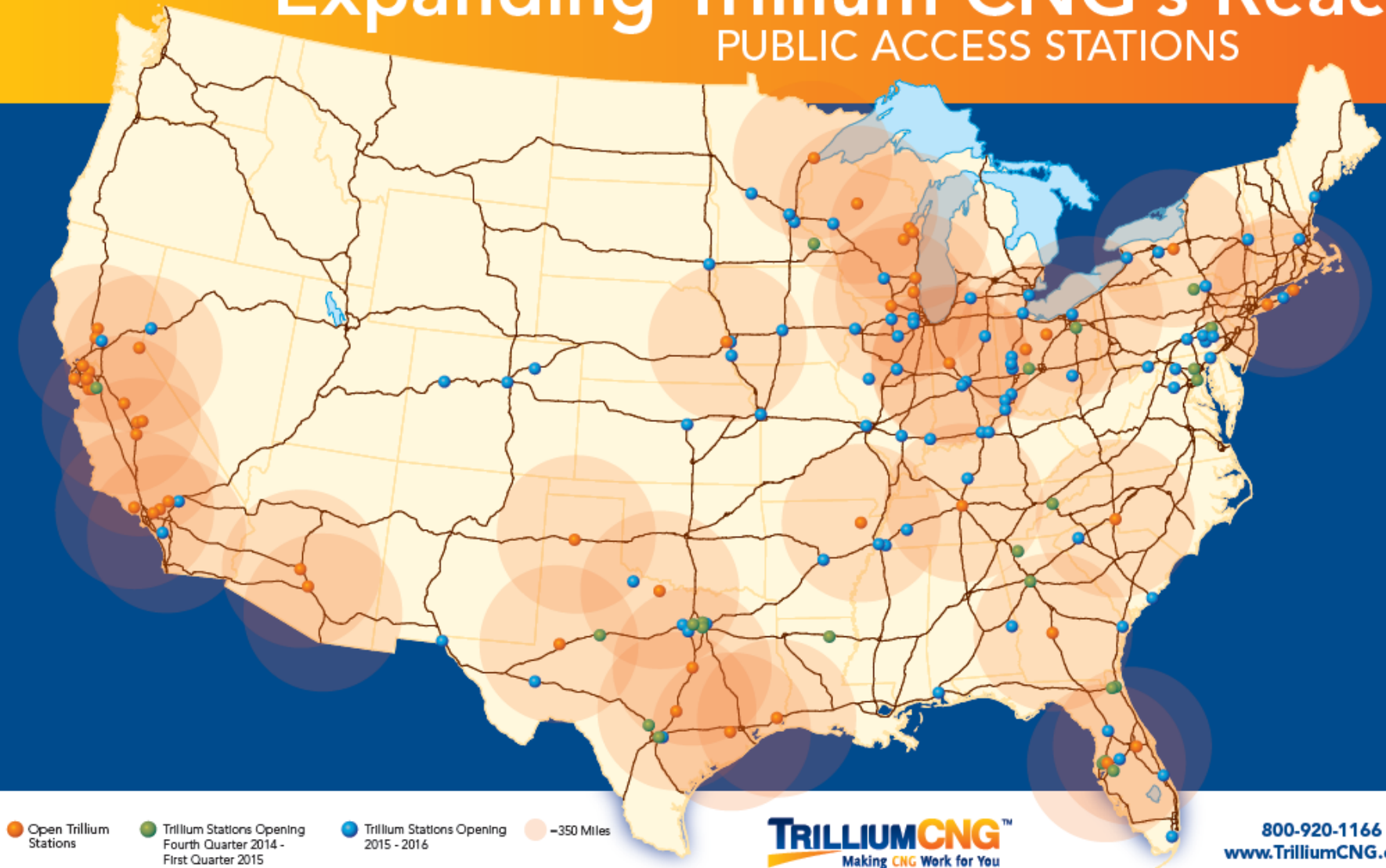
PUBLIC ACCESS CNG STATION OWNERSHIP

Many players providing CNG infrastructure promoting strong competition



TRILLIUM CNG – CONNECTING REGIONS ACROSS THE US

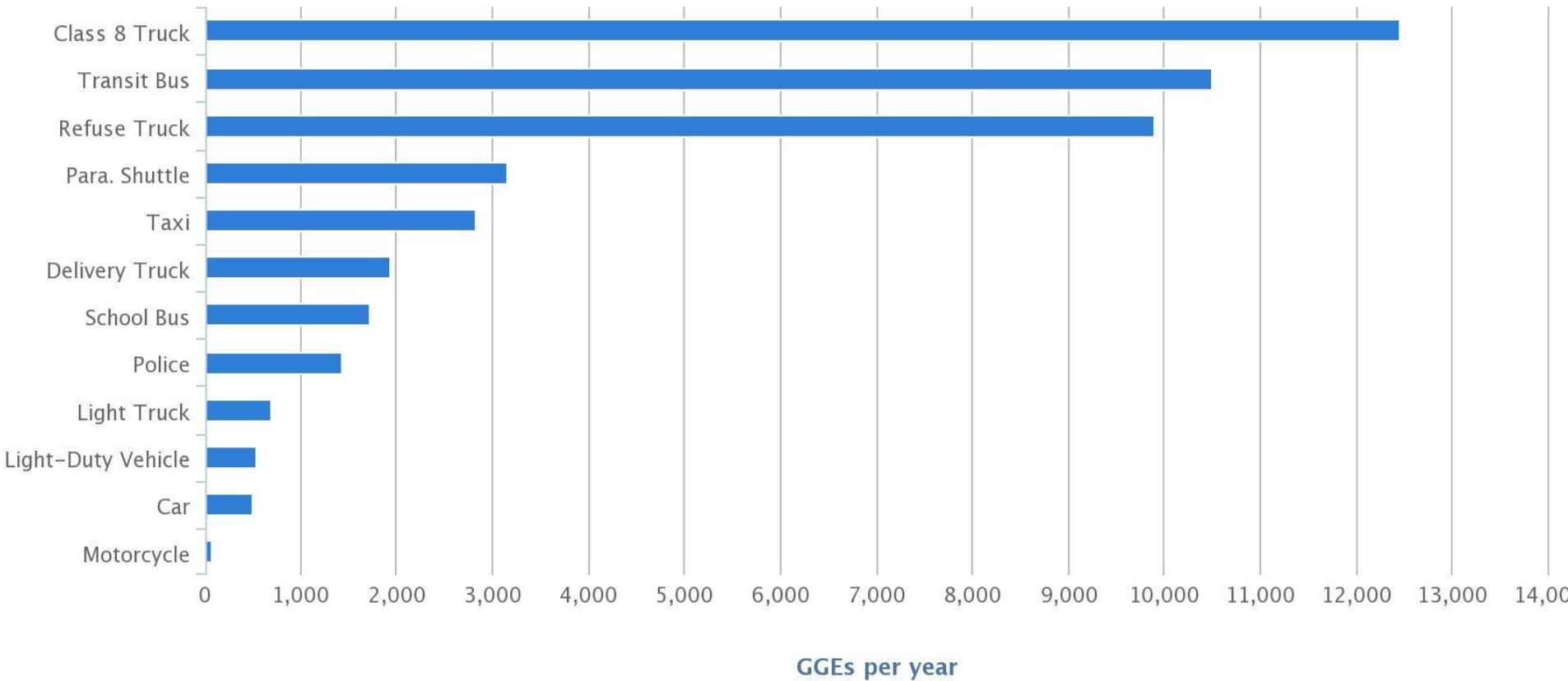
Expanding Trillium CNG's Reach PUBLIC ACCESS STATIONS



Annual Fuel Use of Major Vehicle Categories

High mileage fleets provide among the best CNG conversion economics

Average Annual Fuel Use of Major Vehicle Categories

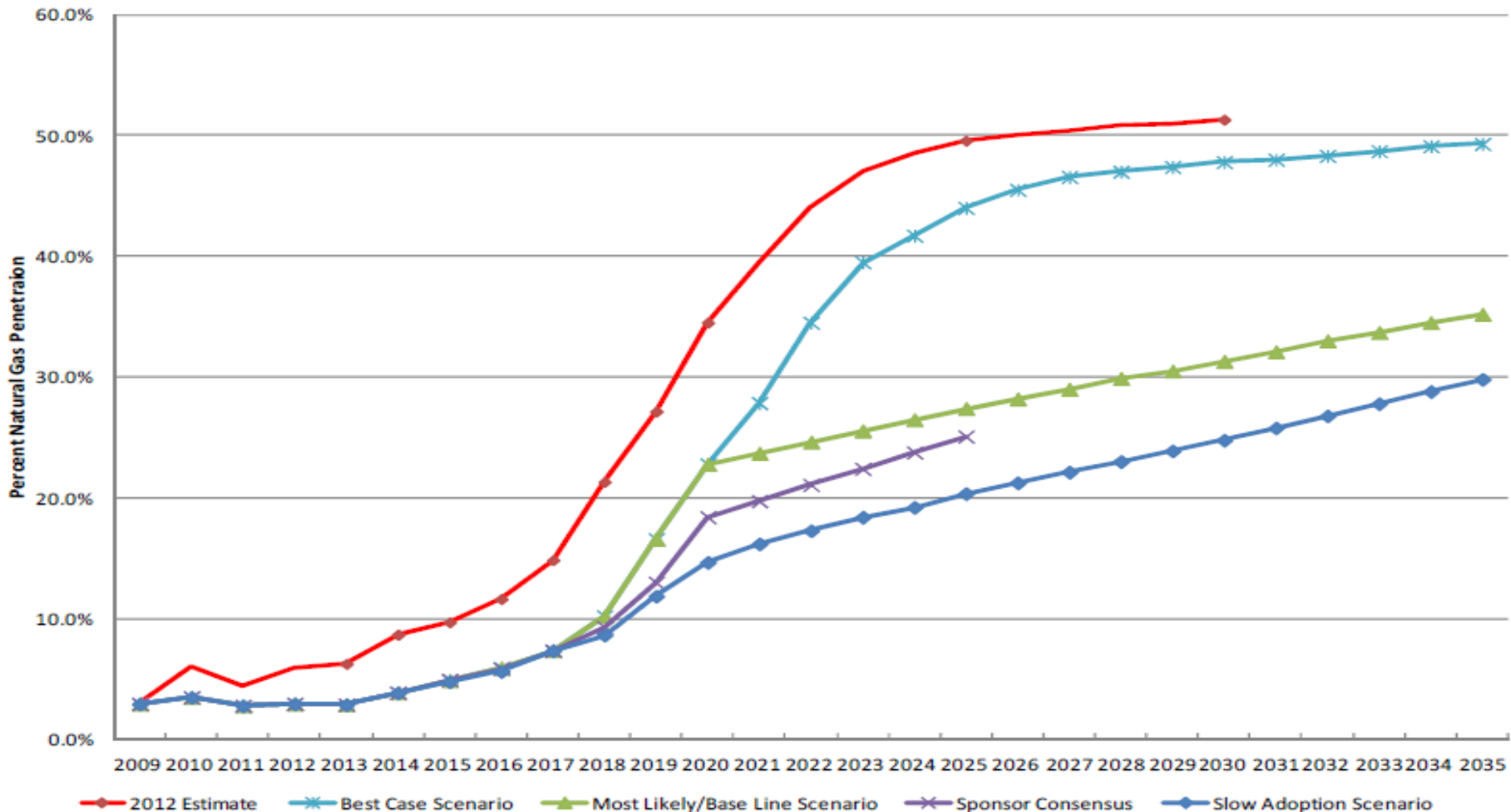


Source - [Federal Highway Administration](#) Table VM-1 and [American Public Transit Association's Public Transportation Fact Book](#) Tables 8, 16, and 21.
Notes: Fuel use is measured in gasoline-gallon equivalents (GGEs), representing a quantity of fuel with the same energy content as a gallon of gasoline.

ACT RESEARCH FORECAST – SEPTEMBER 2014

Strong steady growth projected for HD NGVs

U.S. Class 8 Natural Gas Adoption
(Class 8 Retail Sales Including Refuse and Transit Buses)



ARPA-E QUESTIONS OF CNG PROVIDERS

Do station owners value redundancy, reliability, or do they generally go for the lowest CAPEX route?

What are the tradeoffs?

- *A perspective:*

- *Build for capacity, evaluate options carefully*
- *Reliability is most important*
- *Redundancy is an insurance policy*
- *Priorities vary, but cost is very important across the board*
- *Life cycle cost should drive fleet decision making*

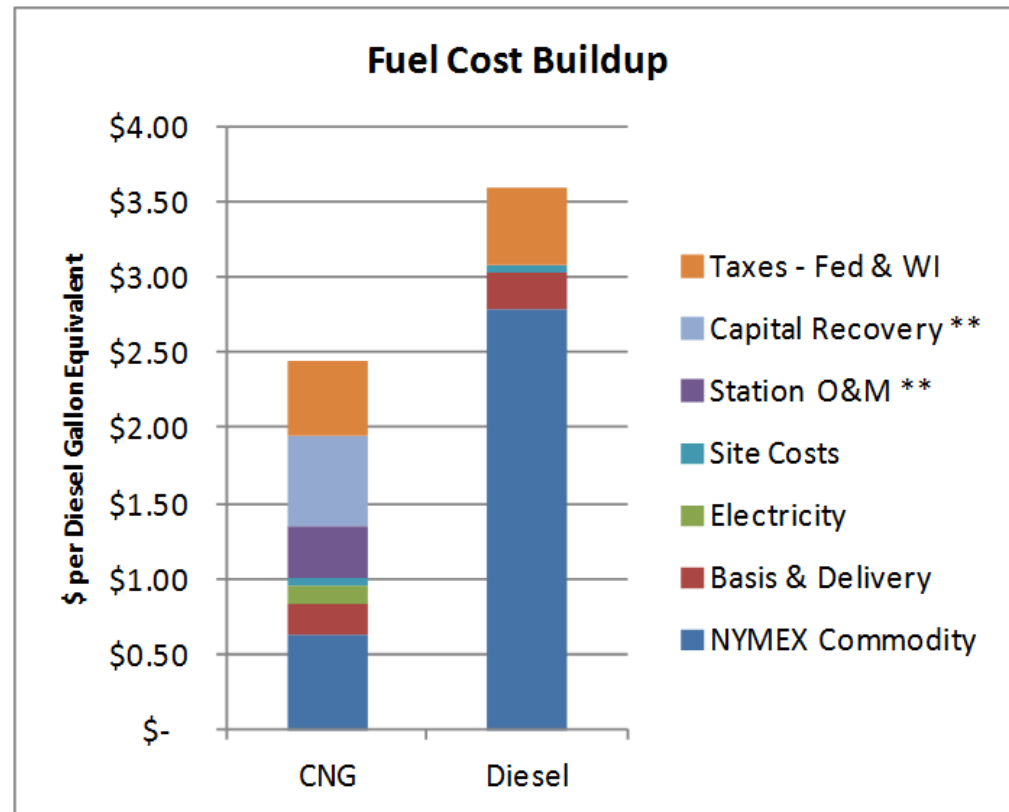
ARPA-E QUESTIONS OF CNG PROVIDERS

What are the technology requirements for expanding the market?

- *A perspective - Top line goal must be to deliver an exceptional alternative to petroleum in every way*
 - *Cost must be comparable to petroleum fuels*
 - *Convenience:*
 - *Location – more infrastructure, conveniently located for users*
 - *Speed of fill – more fuel with less HP*
 - *Station reliability – BMPs, expertise, commitment*
 - *Data capture and processing - Transaction management, smarter trucks and stations*

ARPA-E QUESTIONS OF CNG PROVIDERS

- What are the key cost drivers of stations?
- What is the breakdown of operating and maintenance costs and how much is attributed to the compressors?



For illustration purposes only – actual data will vary

ARPA-E QUESTIONS OF CNG PROVIDERS

- What compressor sizes are most popular for the various markets?
- How do you handle over and under pressurization?
- *One providers perspective:*
 - *Standardization can help keep costs down – engineering, supply chain, maintenance*
 - *Pressurization addressed with standard algorithm today, more can be done here to optimize the customer experience and ensure consumer safety*

ARPA-E QUESTIONS OF CNG PROVIDERS

- Are there any recent trends?
- Any new technological advancements/developments in refueling stations and compressors of note?
- *A perspective – Market technology is advancing rapidly to meet consumers needs:*
 - *Much happening on the truck side*
 - *Much happening on the station side*



EVOLUTION OF THE HD CNG TRUCK⁽¹⁾

Carriers are improving the CNG truck with experience and improved specs

	On Board DGE	Est. MPG	Engine size	Range (Miles)
Gen 1	130	5.3	9.0L	500
Gen 2	140	5.5	9.0L	550
Gen 3	155	6.0	12.0L	800
Gen 4	130	6.2	12.0L	650

+17%

Saddle Creek Logistics has introduced 4 versions of their CNG tractor

Key improvements include:

- Optimal Range
- Improved Fuel Economy

Opportunities:

- CNG data integration
- More transferrable technology

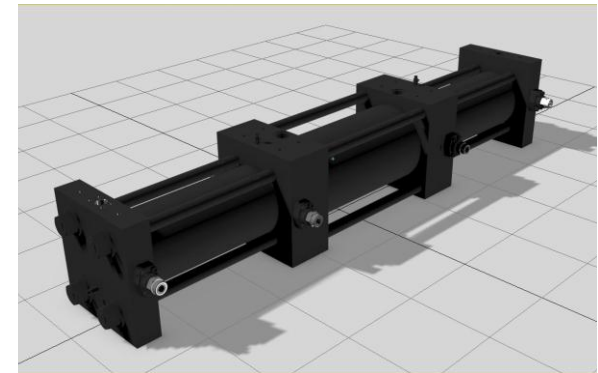


CNG TECHNOLOGY IS EVOLVING

Suppliers are creating new and improved products and partnerships to meet customer needs

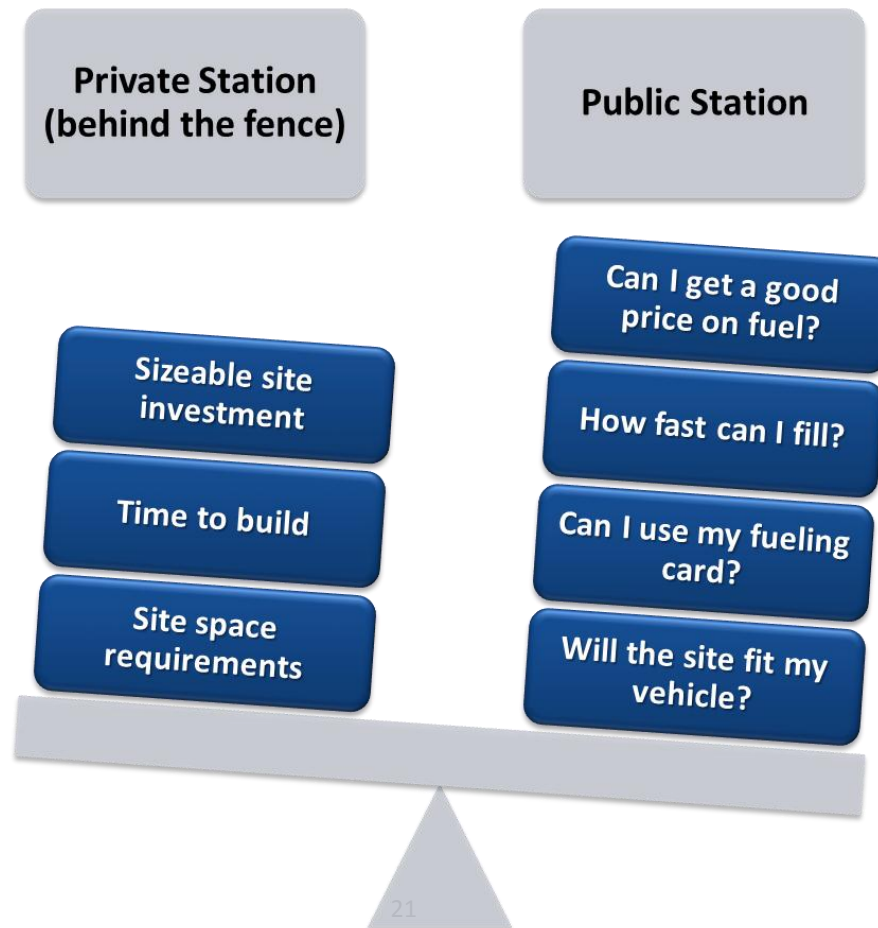
■ Tank Manufacturers, Fuel System Integrators, CNG Providers

- Faster CNG refueling – Trillium's new 7" HY-C
- Smarter, more efficient CNG refueling
- Integrators making larger tank configurations
- More tank fabricators entering the US Market
- Quantum expands value chain by making tanks and packages, Lincoln and Agility form Supply JV
- Larger DOT certified carbon fiber tank pro open up new markets



ARPA-E QUESTIONS OF CNG PROVIDERS

- What are options for small fleets?
- *A perspective – weigh options*



FEDERAL AND STATE POLICY OUTLOOK

Issue	Federal	States
Fuel Rebate	Could be in an extenders package after mid-term election	NA
LNG Tax Fix	Amended into the Senate highway bill failed passage in August	NA
Vehicle and Infrastructure grants and rebates	No activity	State incentives here-and-there, NY, Pa, Fl, Ca, Tx, Co...
Fuel Measurement and Taxation	NWCM action failed in July to establish a DGE standard	Minor revisions made in several states for clarity
Weight allowances for NG vehicles	No activity, little interest at this time	Modest proposals, no action
Federal and State government fleet purchasing requirements	No activity, Clean Skies initiative building momentum	Modest activity, growing area of interest for public fleets

CNG STATION DESIGN CONSIDERATIONS

QUESTIONS?



THANK YOU!

Bill Zobel

**Vice President – Market Development & Strategy
Trillium CNG**

wazobel@trilliumcng.com

PUBLIC, FAST FILL STATION



PUBLIC, FAST FILL STATION



PUBLIC, FAST FILL STATION



PUBLIC, FAST FILL STATION



PRIVATE, FAST FILL STATION



TRANSIT, FAST FILL STATION

